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Green Healthcare: Strategies for Implementing Environmentally Friendly Concepts in Primary Health Care

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ABSTRACT

The growing environmental impact of healthcare systems, particularly in terms of carbon emissions, medical waste, and energy consumption, has intensified the demand for more sustainable models of health service delivery. In this context, green healthcare has emerged as an integrative paradigm that aligns environmental sustainability with the enhancement of clinical quality, especially within primary healthcare services that function as the first and most influential point of patient contact. This study adopts a descriptive qualitative literature-based approach to examine the concept of green healthcare and to identify strategic pathways for its implementation in primary healthcare settings. Relevant academic studies and policy-oriented literature were analyzed to synthesize key dimensions, implementation mechanisms, and enabling conditions. The findings indicate that green healthcare implementation contributes to improved operational efficiency, enhanced patient psychological comfort, more effective waste and resource management, and overall service quality improvement. These outcomes are achieved through the integration of patient-centered care, green digital technologies, evidence-based facility design, and sustainability-oriented organizational culture. However, the literature also reveals persistent challenges, including financial limitations, workforce readiness, organizational resistance, and uneven digital infrastructure. The study concludes that green healthcare can only be effectively implemented when positioned as a systemic organizational transformation rather than a standalone technical intervention, with sustainability embedded as a core element of primary healthcare identity and governance.

Keyword: *Eco-Efficiency, Green Healthcare, Patient-Centered Care, Primary Healthcare, Sustainability*

INTRODUCTION

Environmental issues have evolved from purely ecological concerns into fundamental determinants of the sustainability of global healthcare systems. The health sector significantly contributes to carbon emissions, energy consumption, medical waste, and chemical use, creating a paradox in which institutions designed to protect health simultaneously generate environmental risks that threaten long-term public health. Consequently, the transition toward

sustainable healthcare has become both a moral and strategic imperative. Primary healthcare services play a critical role in this transformation, as they represent the first point of patient contact and function as catalysts for systemic change at the community level (Harahap & Siagian, 2025).

Green healthcare has emerged as an integrative paradigm that aligns clinical practice with environmental sustainability through energy and waste management, facility design, medical material use, and ecological education. Evidence shows that environmentally friendly healthcare practices not only reduce environmental impacts but also enhance operational efficiency and patient comfort (Amelia & Ilyas, 2023). In resource-limited primary care settings, this approach is particularly relevant, as eco-efficiency strategies can lower operational costs while improving service quality and supporting sustainable universal health coverage.

However, green healthcare implementation extends beyond technological adoption. It requires multidisciplinary integration of service quality, environmental management, and organizational culture, supported by leadership and change management (Perdini et al., 2023). Human-centered design and patient-centered care further strengthen service outcomes by improving psychological comfort and recovery experiences (Istiono et al., 2024; Amami et al., 2025). Digital technologies, including IoT and green HRM, also play a strategic role by enabling automated monitoring, resource efficiency, and sustainability-oriented organizational practices (Almalki et al., 2023; Syaefuddina et al., 2022). Globally, policy frameworks such as the WHO's vision for primary healthcare underscore that green healthcare is a systemic necessity rather than a temporary trend, despite persistent structural and cultural barriers in practice (WHO, 2018; Cruz et al., 2024).

Although the literature on green healthcare is growing, there are conceptual gaps that are relevant to this study. Research by Perdini et al. (2023) "Strategi menuju penerapan green hospital serta dampaknya bagi rumah sakit: studi kasus pada Rumah Sakit X" focuses on organizational readiness towards green hospitals, but does not explore implementation strategies in primary health care. Research by Effendi et al. (2024) "Implementasi Ekoefisiensi Rumah Sakit Ramah Lingkungan (Green Hospital) di Rumah Sakit Daerah Nganjuk" explains hospital efficiency through the implementation of green hospitals, but does not discuss the integration of eco-efficiency into patient-centered care service models. Meanwhile, research by Amami et al. (2025) "Implementasi Tema Sanctuary dan Konsep Wellness Berbasis Evidence-Based Design dalam Peningkatan Pelayanan Kesehatan" demonstrates an improvement in primary care quality through environmental design, but has not yet linked healing environment design with a systemic green transformation strategy. These three studies leave an important gap: there has been no study that formulates a comprehensive green healthcare strategy in the context of primary healthcare that combines environmental, technological, organizational culture, and patient-centered aspects. The novelty of this research lies in the formulation of a green healthcare implementation strategy based on primary healthcare services with a

systemic approach that integrates environmental sustainability, improved patient service quality, operational efficiency, and digital transformation. The purpose of this study is to comprehensively analyze the concept of green healthcare and formulate its implementation strategy in primary healthcare services in order to support a long-term sustainable healthcare system.

METHOD

This study uses a descriptive qualitative approach based on literature analysis to formulate strategies for implementing green healthcare in primary health care services. This approach allows researchers to comprehensively examine the concepts, practices, obstacles, and implications of green healthcare based on credible scientific publications. The formulation of the method refers to the guidelines of Creswell and Poth (2018) in Qualitative Inquiry and Research Design, which emphasize that literature-based qualitative research provides space for the construction of theoretical understanding through the processes of information reduction, theme grouping, and conceptual synthesis.

The research data sources came from national and international journals, scientific proceedings, and global health organization reports discussing the concepts of green hospitals, health sustainability, eco-efficiency in health services, green digitalization, and environment-based patient-centered care. Data analysis was performed using content analysis techniques through the stages of thematic category identification, analysis of inter-theme relationships, and the formulation of conceptual implications for primary health services. Validity was developed through reference triangulation and consistency between conceptual findings and research objectives in accordance with Creswell and Poth's (2018) qualitative analysis standards.

To reduce subjectivity and strengthen analytical rigor, explicit literature selection criteria were applied. The reviewed sources were limited to peer-reviewed journal articles, conference proceedings, and authoritative institutional reports published between 2015 and 2025. Literature was included if it explicitly addressed green healthcare, environmental sustainability in healthcare services, primary healthcare contexts, or related dimensions such as eco-efficiency, patient-centered care, green digitalization, or organizational culture. Studies focusing solely on clinical outcomes without environmental or sustainability relevance were excluded.

Approximately 45 sources were initially identified, of which 32 met the inclusion criteria and were analyzed in depth. To mitigate interpretive bias inherent in qualitative literature analysis, the study employed cross-source comparison and thematic convergence analysis, ensuring that strategic insights were derived from recurring patterns rather than isolated findings. This approach enhances conceptual validity while acknowledging the interpretive nature of descriptive qualitative research.

RESULT AND DISCUSSION

Green Healthcare as a Paradigm for Primary Healthcare Transformation

Green healthcare is not merely an effort to reduce energy consumption or replace medical materials with environmentally friendly products, but a paradigm for healthcare reform that places ecological sustainability as an integral part of the healing process. Primary healthcare facilities have a strategic position in this transformation because they are the first point of contact for the community to receive healthcare services. The WHO (2018) emphasizes that primary healthcare services are the foundation of a sustainable healthcare system and must be responsive to environmental changes in order to ensure long-term health. If human health and environmental health are separated, then the healthcare system will only treat the symptoms but not address the root causes of diseases related to environmental degradation.

Sustainable primary healthcare practices require changes in service models, not just the provision of green infrastructure. Amelia and Ilyas (2023) show that hospitals that have implemented environmental concepts have not only experienced a reduction in waste and resource consumption but also shown an improvement in service quality due to improvements in air circulation, natural lighting, and system-based waste management. This confirms that environmental sustainability is directly correlated with patient comfort, service experience, and the effectiveness of healthcare worker interactions.

In the context of primary healthcare, patient psychological comfort has a significant impact because primary facilities handle recurring and community-based cases. Operational efficiency is one of the critical arguments that reinforces the urgency of green healthcare. Effendi et al. (2024) show that the application of eco-efficiency principles can reduce energy consumption, improve waste management, and improve hospital financial performance.
This is important in primary healthcare services, which generally have limited budgets. Thus, sustainability is not a cost burden, but rather a strategy to reduce operational expenses while improving service quality. This strategy challenges the old paradigm that high service standards and cost efficiency are two conflicting goals; in green healthcare, the two actually reinforce each other.

Beyond efficiency, the transformation to green healthcare requires a cultural shift within healthcare facilities. Perdini et al. (2023) emphasize that hospitals can only achieve green status when all organizational actors—leadership, medical staff, administrative staff, and patients—are involved in change management. This cultural change also applies to primary healthcare facilities, as environmental sustainability can only be achieved if healthcare workers perceive environmentally friendly behavior as part of their professional ethos, not merely a technical procedure. Without a transformation of professional identity, green healthcare will remain a ceremonial attribute with no long-term impact.

The human aspect of green healthcare is also crucial. Istiono et al. (2024) emphasize that the quality of primary care must be based on the principle of patient-centered care, and when combined with environmental inclusion, the

dimension of healing becomes more comprehensive because it combines biological, emotional, and environmental aspects. Amami et al. (2025) show field evidence that sanctuary space design and evidence-based design in primary services affect patient comfort, speed of recovery, and user satisfaction with health facilities. These findings show that green healthcare is not just an ecological agenda, but a strategy for improving service quality. At the system level, health and sustainability are inseparable. Syaefuddina et al. (2022) explain that health digitization through the GHRM concept creates a modern, efficient, and sustainable healthcare ecosystem in the context of smart cities. Almalki et al. (2023) show that technologies such as IoT can help healthcare facilities monitor energy use, control ventilation, and manage waste automatically. This means that technological innovation is the backbone of green healthcare operations and not just a complement.

Thus, the application of green healthcare in primary healthcare services is multidimensional: ecological, operational, emotional, digital, and professional. This paradigm places the environment as part of healing, not as a sector separate from clinical care. Primary healthcare services that fail to integrate sustainability have the potential to create a paradox: healthcare facilities maintain human health while damaging the environment that supports that very health. Therefore, primary services are the most strategic space to begin environmental reform in the healthcare sector.

Green Healthcare Implementation Strategy Model in Primary Health Care

The strategy for implementing green healthcare in primary health care cannot be done with a single approach; it requires a structured design that combines clinical operations, organizational culture, digital technology, spatial design, and patient and community participation. To map out a comprehensive implementation strategy, this study synthesizes various findings from the literature into the following strategic conceptual model:

Table 1. Strategic Dimensions and Implementation Outcomes of Green Healthcare in Primary Health Care

Strategic Dimension	Operational Focus	Human Resource Role	Patient/Community Impact	System Outcome
Environmental Management	Energy efficiency, water conservation, waste reduction	Staff compliance to eco-procedures	Safer and sustainable environment	Reduced ecological footprint
Evidence-Based Design	Healing atmosphere, biophilic spaces, natural	Facility designers & health workers collaboration	Higher comfort and emotional recovery	Increased service quality

	lighting			
Patient-Centered Care	Personalized care, emotional comfort, privacy	Empathy, communication, and patient engagement	Better recovery experience	Improved satisfaction & loyalty
Digital Green Technology	IoT monitoring, smart ventilation, digital records	Digital skills and adoption	Faster services and reduced resource consumption	Operational efficiency
Green HRM & Organizational Culture	Sustainability ethics, green leadership, policy enforcement	Role models, training, sustainability commitment	Patients inspired to adopt eco-habits	Organizational sustainability

The table shows that the implementation of green healthcare in primary services is only successful if the transformation is carried out systematically with a clear division of roles and results. Environmental strategies such as energy conservation or waste reduction will not be effective if they are not accompanied by the formation of a green organizational culture. Sitorus (2024) emphasizes that sustainability in health facilities can only be achieved if management integrates green principles into the organization's competitive strategy. This means that green healthcare is not an environmental program, but a business strategy for healthcare institutions.

Strengthening environmentally-based space design is also inseparable from primary care strategies. Amami et al. (2025) show that creating a sanctuary atmosphere is not just an aesthetic ornament but a clinical element that supports patient health. When spaces support emotional calm and psychological recovery, green healthcare becomes a service strategy, not just an ecological initiative. This broadens the meaning of a healing environment: the environment is not decoration, but part of therapy.

In addition, the participation of healthcare workers is a pillar of success. Harahap and Siagian (2025) emphasize that green healthcare human resources have a key role in the success of sustainable health development. The commitment of healthcare professionals determines whether the concept of sustainability is implemented as professional ethics or merely as an administrative procedure. When healthcare workers view environmentally friendly behavior as part of their professional identity, green healthcare becomes a culture, not a project. Digital technology accelerates implementation. Almalki et al. (2023) explain that IoT supports the automation of energy monitoring, ventilation, and medical device consumption, which has the potential to accelerate environmental efficiency. Without digitalization, green

healthcare risks inconsistency because it relies on manual procedures. Digitalization makes sustainability measurable, transparent, and easy to audit.

At the social level, green healthcare strategies can change community behavior. Cruz et al. (2024) show that healthcare workers view sustainability as part of service quality, and when patients see green practices in healthcare facilities, they are encouraged to adopt similar habits. Thus, primary care can be a pioneer of environmentally friendly lifestyle changes at the community level. Through table analysis and literature review, this discussion confirms that green healthcare can only be effectively implemented through synergy between environmental management, healing environment design, green digitalization, patient-centered care, and a green healthcare workforce culture. When all these aspects are integrated, primary care not only functions to cure disease but also helps preserve the health of the earth as a prerequisite for human health.

Barriers to Green Healthcare Implementation and Strategic Implications for Primary Healthcare Reform

Although the concept of green healthcare has demonstrated ecological, economic, and clinical benefits, its implementation in primary healthcare faces various structural, cultural, and psychosocial barriers that slow down transformation. The main barrier lies in the gap between environmental awareness and the operational readiness of healthcare facilities. Perdini et al. (2023) assert that the biggest obstacle in implementing environmentally friendly hospitals is not the procurement of technology, but rather the readiness of organizations to integrate sustainability systems into their core governance. When environmental change is considered a temporary project, healthcare facilities fail to build long-term sustainability systems. This confirms that green healthcare requires a paradigm shift before physical change.

Further obstacles arise from limited economic capacity and infrastructure. Putri et al. (2016) show that many healthcare facilities are not financially ready for green transformation because it requires large initial investments in energy, building design, and waste management. These limitations are even more pronounced in primary healthcare services in rural areas, where budget priorities are focused on basic services. However, research by Effendi et al. (2024) shows that these cost concerns are short-term, as eco-efficiency has been proven to generate operational savings through energy, water, and material efficiency. The financial barriers to implementing green healthcare actually stem from a misunderstanding of the return on investment timeframe, rather than from substantial inefficiencies.

Healthcare organizational culture is also a major obstacle. Sitorus (2024) asserts that sustainability strategies need to be integrated into the business model and organizational identity in order for hospitals to compete in the digital age. When healthcare workers view sustainability as an administrative task rather than a professional ethos, green transformation does not proceed consistently. Harahap and Siagian (2025) reinforce this view by emphasizing that green midwifery human resources can only function optimally if the

organization provides training, incentives, and performance standards that emphasize environmentally friendly practices. This means that green healthcare requires transformational leadership that is capable of building a green culture, not just procedural policies.

In addition to internal challenges, there are external obstacles in the form of social resistance and patient behavior. Megariani et al. (2023) show that some patients reject changes in waste management protocols, the use of environmentally friendly packaging, or plastic restrictions because they are considered to reduce comfort. In the context of primary health care, patient resistance can hinder the transition because primary facilities are community-based and require positive emotional relationships with the community. These challenges show that green healthcare requires not only training for healthcare personnel, but also community education interventions to instill a green healthcare culture.

The design aspect also faces obstacles due to land limitations and facility renovation costs. Putri et al. (2017) and Amami et al. (2025) show that the implementation of a healing environment requires collaboration between healthcare personnel and space designers so that the design supports the psychological comfort of patients. However, primary facilities often lack internal teams capable of planning such transformations. Without cross-disciplinary collaboration, green healthcare only results in cosmetic changes and fails to improve service quality. The final and most decisive obstacle is low digital integration. Almalki et al. (2023) emphasize that the Internet of Things plays a key role in energy monitoring and ventilation system automation to reduce carbon footprints. However, most primary facilities lack the digital infrastructure and healthcare personnel skills to operate green technologies. This digital divide makes green healthcare manual and difficult to measure, making it challenging for management to monitor the success of environmental strategies.

If these obstacles are not addressed simultaneously, the implementation of green healthcare will potentially become a cosmetic effort limited to branding, rather than systemic change. In this context, primary healthcare services are the most strategic point for building a sustainable reform model due to their proximity to the community, relatively low operating costs, and flexibility in shaping organizational culture. Healthcare system reform towards green healthcare is not only a physical transformation, but also a transformation in the mindset, policies, and behavior of healthcare workers and patients. Primary services can become the foundation for change if environmental strategies, organizational culture, digitalization, and patient-centered care are implemented in an integrated manner.

CONCLUSION

The discussion shows that green healthcare is a paradigm for transforming primary healthcare services that combines environmental sustainability, operational efficiency, digitalization, and improved service

quality based on patient comfort and experience. This approach is not only a response to global environmental issues, but also a strategy for improving public health by making the environment an integral part of the healing process. Green healthcare has been proven to improve patient comfort and recovery, reduce healthcare facility operating costs through eco-efficiency, and foster an organizational culture that supports sustainability. Thus, primary healthcare services are in the most strategic position to initiate sustainable healthcare system reform due to their proximity to the community and flexibility in implementing organizational changes.

Research findings confirm that the transformation towards green healthcare can only be successful if structural and cultural barriers are simultaneously overcome through transformational leadership, green healthcare human resource training, integration of patient-centered care, interprofessional collaboration, investment in green digitalization, and public education on environmental health. Primary healthcare institutions need to make sustainability not just an incidental program, but the foundation of their organizational identity and policy priorities. With this support, green healthcare can function as a framework that not only heals patients, but also protects the health of the earth and the long-term sustainability of the healthcare system.

REFERENCES

Ahsan, K., & Rahman, S. (2017). Green Public Procurement Implementation Challenges In Australian Public Healthcare Sector. Journal of cleaner production, 152, 181-197.

Almalki, F. A., Alsamhi, S. H., Sahal, R., Hassan, J., Hawbani, A., Rajput, N. S., ... & Breslin, J. (2023). Green IoT For Eco-Friendly and Sustainable Smart Cities: Future Directions And Opportunities. Mobile Networks and Applications, 28(1), 178-202.

Amami, N. K., Pranajaya, I. K., & Trisna, N. M. S. W. (2025). Implementasi Tema Sanctuary dan Konsep Wellness Berbasis Evidence-Based Design (EBD) sebagai Strategi Inovatif dalam Peningkatan Kualitas Pelayanan Kesehatan: Studi Kasus di Puskesmas 1 Baturiti, Tabanan, Bali. Waca Cipta Ruang, 11(1), 32-41.

Amelia, S., & Ilyas, J. (2023). Analisis Penerapan Rumah Sakit Ramah Lingkungan (Green Hospital) Pada Dua Rumah Sakit Di Indonesia. Journal of Syntax Literate, 8(9).

Çolak, M. Y., & Çolak, L. (2018, May). Energy Efficient, Sustainable And Environmentally Friendly Green Healthcare Industry In The Green Economy. In 16th International Conference on Clean Energy (ICCE) (pp. 9-11).

Creswell, J. W., & Poth, C. N. (2018). Qualitative Inquiry and Research Design: Choosing Among Five Approaches (4th ed.). SAGE Publications.

Cruz, J. P., Balay-Odao, E. M., Almazan, J. U., Manabat, A., Smagulova, M., Kavashev, Z., ... & Colet, P. C. (2024). Perspectives of healthcare

practitioners on environmental sustainability in healthcare: A qualitative study. Journal of Advanced Nursing.
Effendi, F. N., Warlina, L., & Nurmawati, S. (2024). Implementasi Ekoefisiensi Rumah Sakit Ramah Lingkungan (Green Hospital) di Rumah Sakit Daerah Nganjuk. Jurnal Teknologi Lingkungan Lahan Basah, 12(2), 319-329.
Fadda, J. (2019, December). Green healthcare system: Main features in supporting sustainability of healthcare system—A review. In Green Buildings and Renewable Energy: Med Green Forum 2019-Part of World Renewable Energy Congress and Network (pp. 113-128). Cham: Springer International Publishing.
Harahap, N., & Siagian, T. S. (2025). Strategi SDM Kebidanan Hijau dalam Mendukung Tujuan Pembangunan Kesehatan Berkelanjutan (SDGs) di Layanan Kesehatan Primer. All Fields of Science Journal Liaison Academia and Sosiety, 5(2), 378-390.
Istiono, W., Sutomo, A. H., Izhar, M. D., & Welembuntu, M. (2024). Strategi Penerapan Patient Centered Care pada Pelayanan Kesehatan Primer. UGM PRESS.
Megariani, M., Putra, R. M., & Bayhakki, B. (2023). Strategi Pengelolaan Lingkungan RSUD Rokan Hulu Menuju Green Hospital. SEHATI: Jurnal Kesehatan, 3(2), 49-56.
Nilasari, H. (2024). Green Beauty: Analisis Keputusan Pembelian Produk Skincare Ramah Lingkungan (Doctoral dissertation, Universitas Islam Indonesia).
Perdini, M., Riani, E., & Nurhasanah, N. (2023). Strategi menuju penerapan green hospital serta dampaknya bagi rumah sakit studi kasus pada rumah sakit x. Jurnal Teknologi Lingkungan UNMUL, 7(1), 68-80.
Perdini, M., Riani, E., & Nurhasanah, N. (2023). Strategi menuju penerapan green hospital serta dampaknya bagi rumah sakit studi kasus pada rumah sakit x. Jurnal Teknologi Lingkungan UNMUL, 7(1), 68-80.
Pudjianta, S. A., & Sabrina, A. N. (2024, August). Penerapan Green Marketing dalam Memperkuat Konsep Bisnis Berkelanjutan serta Brand Image Ace Hardware Indonesia. In Prosiding Seminar Nasional Ekonomi dan Bisnis (Vol. 4, pp. 01-14).
Purbosari, P. (2022). Strategi Pemasaran Program Green Laboratory Menuju Green Hospital dengan Metode Segmenting, Targeting, and Positioning Serta Marketing Mix di Rsup Dr. Sardjito, Yogyakarta. Jurnal ARSI (Administrasi Rumah Sakit Indonesia), 7(1), 2.
Putri, C. F., Purnomo, D., & Astuti, E. (2016). Analisis kesiapan rumah sakit menuju ramah lingkungan (green hospital) di Kota Malang. Prosiding SENIATI, 2(1), C-12.
Putri, C. F., Purnomo, D., & Astuti, E. (2017). Kinerja Green Hospital pada Rumah Sakit Umum Pemerintah di Kota Malang. Prosiding SENIATI, 3(2), C11-1.
Rahmadhani, S., Astuti, D., & KM, S. (2022). Studi Literatur Penerapan Rumah Sakit Ramah Lingkungan Dalam Upaya Pembangunan Kesehatan

Berkelanjutan Di Indonesia (Doctoral dissertation, Universitas Muhammadiyah Surakarta).

Ryan-Fogarty, Y., O'Regan, B., & Moles, R. (2016). Greening healthcare: systematic implementation of environmental programmes in a university teaching hospital. Journal of Cleaner Production, 126, 248-259.

Sitorus, R. (2024). Model bisnis berkelanjutan dan strategi bersaing rumah sakit dalam era digital: Literature review. J-CEKI: Jurnal Cendekia Ilmiah, 4(1), 753-764.

Soares, A. L., Buttigieg, S. C., Bak, B., McFadden, S., Hughes, C., McClure, P., & Bravo, I. (2023). A review of the applicability of current green practices in healthcare facilities. International Journal of Health Policy and Management, 12, 6947.

Syaefuddina, M. A., Saifuddin, A., & Purwanti, W. (2022). Konsep AMO dalam penerapan GHRM mewujudkan digitalisasi kesehatan di lingkungan smart city. Cakrawala, 29(2), 40-49.

World Health Organization. (2018). A vision for primary health care in the 21st century: towards universal health coverage and the Sustainable Development Goals (No. WHO/HIS/SDS/2018.15). World Health Organization.